

**ICB PhD public presentations****CATALYTIC PROCESSES FOR NATURAL GAS VALORIZATION VIA BROMINE CHEMISTRY****Vladimir Paunović**

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**HCI H 8.1, 17.00 h**

**Project Summary:** Bromine-mediated upgrading of natural gas constitutes an attractive technology to valorize this abundant feedstock for the production of valued chemicals and liquid fuels. Its industrial implementation is contingent on full recycling of hydrogen bromide (HBr), which is the end form of halogen in different process steps. Catalytic oxidation of HBr into bromine and selective methane oxybromination into bromomethanes ( $\text{CH}_3\text{Br}$  and  $\text{CH}_2\text{Br}_2$ ) are the main routes to close the halogen loop and are in focus of this project. Herein, the first stable HBr oxidation catalyst enabling the highly sought low-temperature operation under stoichiometric feed was developed. Furthermore, catalyst design strategies to maximize the yield of bromomethanes in oxybromination were devised based on the acquired mechanistic understanding of this reaction. It has been also shown that switch from hydrogen bromide to hydrogen chloride in methane oxyhalogenation might unlock new pathways for selective methane upgrading, demonstrating the great versatility of the halogen chemistry for natural gas valorization.

**CV:** V. Paunović finished bachelor and master studies in chemical engineering at the University of Belgrade, Serbia (2012). After completing his master thesis in the group of Prof. K. Sundmacher at Max Planck Institute for Dynamics of Complex Technical Systems in Magdeburg, Germany, (2013), he started his PhD under supervision of Prof. J. Pérez-Ramírez at ETH Zurich (2014).